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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,398	10/03/2005	Christopher James Philip Clements	M02B124	5844

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EXAMINER	
WU, IVES J	

ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
02/09/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LORETTA.SANDOVAL@EDWARDSVACUUM.COM

Office Action Summary	Application No.	Applicant(s)	
	10/509,398	CLEMENTS ET AL.	
	Examiner	Art Unit	
	IVES WU	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,8,10-11,13-18,20-21,23,25-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,8,10-11,13-18,20-21,23,25-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

(1). Applicants' Amendments and Remarks filed on 10/6/2009 have been received.

Claims 1, 18 are amended.

Claim 2 is cancelled. Total cancelled claims are 2, 6-7, 9, 12,19, 24 and 28.

The rejection of claim 2 in prior Office Action dated 5/27/2009 is withdrawn accordingly.

The rejections of claims 1 and 18 are modified in response to the Amendments and present4ed together with the rest of claims in the following.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(2). **Claims 1, 3-5, 18, 21** and **25-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachweh et al (US 6284022B1).

As to step of contacting the gas stream with water at a temperature of at least 40 °C for facilitating chemical reaction between the gas stream and the water at a temperature at a temperature of at least 40 °C in a method of scrubbing a halogen-containing gas stream in **independent claim 1**, and water to be in liquid state in **claim 3**, gas stream being contact with water vapour in **claim 4**, the gas stream being contact with water at a temperature of from 35 °C to 80 °C in **claim 5**, Sachweh et al (US 6284022B1) disclose method for removing contaminants from a gas stream (Title). It relates to methods for removing gaseous contaminants and aerosols from a vapor-saturated gas stream in a scrubber column, with a scrubbing liquid, the temperature of which is lower by at least 2° C than the temperature of the gas stream, resulting in the formation of a **vapor phase** (Abstract). Gas streams which are suitable are in principle all gas streams which have a carrier gas which is to be cleaned at the process temperature and which contains both gaseous and particulate contaminants which are to be removed (Col. 2, line 58-61). Suitable scrubbing liquids are, for example, distilled water, demineralized water, tap water, process water, aqueous solutions of acids or bases, or organic solvents such as toluol, butanol, ethanol or acetone (Col. 3, line 55-58). For example, if water is used as scrubbing liquid, it is then possible to remove, for example, the hydrohalic acids, **HF, HCl** or **HBr**, from the gas

stream without problems (Col. 2, line 3-6). In principle, all scrubber columns in which the necessary contact surface is available are suitable (Col. 4, line 44-45). The temperature of the gas stream when it enters the column may be up to approximately 100 °C. In a preferred embodiment, the temperature of the gas stream is approximately 40 to approximately 90 °C (Col. 4, line 58-61). The temperature of the scrubbing liquid should be lower than the temperature of the gas stream. In a preferred embodiment, the temperature of the scrubbing liquid lies at least approximately 10 to approximately 15 °C below the temperature of the gas stream. Examples of temperature differences which are particularly preferred are approximately 30 to approximately 60 °C., in particularly approximately 40 to approximately 50 °C. In a preferred embodiment, the scrubbing liquid is at a temperature of from approximately 2 to approximately 50 °C (Col. 4, line 64 – Col. 5, line 8). It would facilitate chemical reaction as claimed because the substantially identical components as well as operating conditions claimed by Applicants and by prior art.

As to gas stream being subject to at least one further treatment step comprising contacting the gas stream with water at a temperature of less than 30 °C for dissolving the gas stream in the water of less than 30 °C in **independent claim 1**, in view of the temperature range of scrubbing water disclosed by Sachweh et al (US06284022B1), it would dissolve the gas as claimed, in view of substantially identical components as well as the operating conditions claimed by Applicants, and by prior art, it also would be obvious to have second scrubber with water temperature less than 30 °C together because purifying an old product renders obvious. *In re Cofer,* 354 F.2d 664, 148 USPQ 268 (CCPA 1966). Further Sachweh et al (US 6284022B1) disclose the method to be carried out in two stages, a 1st stage using hot water for scrubbing and a 2nd stage using cold water for scrubbing (Col. 1, line 63-65).

As to a hot wash scrubbing chamber, halogen-containing gas stream water temperature, outlet from hot wash chamber for treated gas in an apparatus in **independent claim 18**, the disclosure of Sachweh et al is incorporated herein by reference, the most subject matters as currently claimed has been recited in applicants' claim 1 and has been discussed therein. Furthermore, Sachweh et al (US 6284022B1) disclose the Figure 2 showing a scrubber column, a vapor-saturated gas stream enters at the bottom end of column and cold scrubber liquid is fed to the top end of the column, an outlet at bottom of the scrubber column (not numbered) which read

on the limitations of instant claim, and it would contain a source of halogen-containing gas, a water supply device in order to supply to the scrubber.

As to the apparatus for scrubbing a halogen from a gas stream in **independent claim 18**, the intended use is not considered as limitation.

As to a cold wash scrubbing chamber downstream of hot wash scrubbing chamber, a cold water spray, water temperature in **independent claim 18**, the disclosure of Sachweh et al is incorporated herein by reference, the most subject matters as currently claimed, has been recited in applicants' claim 1, and has been discussed therein. Furthermore, it would be obvious to have 2nd scrubbing stage for water temperature less than 30 °C because duplication in parts. *In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).*

As to a communication pathway for transport of the treated gas from the outlet of hot wash chamber into the old wash chamber, and an outlet for treated gas from cold wash chamber in **independent claim 18**, Sachweh et al (US 6284022B1) disclose the segments in scrubber column in Figure 2, which would have a communication pathway between hot and cold scrubbing if 2nd cold stage of scrubbing is installed. As illustrated in Figure 2, there is an outlet for treated gas (not numbered).

As to fluorine-containing gas in **claims 21** and **27**, Sachweh et al (US 6284022B1) disclose HF (Col. 4, line 5).

As to halogen-containing gas stream being an exhaust gas from semiconductor manufacture in **claim 25**, Sachweh et al (US 6284022B1) disclose gas stream being suitable in principle all gas streams which have a carrier gas which is to be cleaned at the process temperature and which contains both gaseous and particulate contaminants which are to be removed (Col. 2, line 58-61). It would include the exhaust gas from semi-conductor manufacture as claimed.

As to each water contacting step to be arranged to be generally counterflow relationship with the water in **claim 26,** Sachweh et al (US 6284022B1) disclose in countercurrent or cocurrent (Col. 5, line 42-45).

(3). **Claims 8, 10-11, 13-17, 20, 23** and **28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachweh et al (US 6284022B1) in view of Smith et al (EP-1023932A1).

As to one further treatment step of diluting the gas stream with a diluent gas in **claim 8**, gas stream being contacted with the diluent gas in a cyclone device in **claim 10**, Sachweh et al (US 6284022B1) **do not teach** the further treatment step of diluting in a cyclone as claimed.

However, Smith et al (EP 1023932A1) **teach** gas purifying cyclone (Title). The cleaning system comprises a cyclone for receiving the gas stream and separating the gas from the particles, where the cyclone processes means for the introduction of a diluent gas stream (Abstract).

The advantage of using a diluent gas in cyclone separator, in particular is to reduce the concentration of pyrophoric gases in noxious gas stream below their flammability limits ([0019]).

Therefore, it would have been obvious at time of the invention to add cyclone with diluent gas taught by Smith et al with the scrubbing tower in the method of Sachweh et al in order to attain the advantages. Moreover, further purification of product is obvious. *MPEP §§ 2144.05.VII. In re Cofer, 354 F.2d 664, 148 USPQ 268 (CCPA 1966).*

As to gas stream being contacted with the diluent gas in a cyclone device in **claim 22,** the disclosure of Sachweh et al, Smith et al is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claim 10, and have been discussed therein.

As to step of contacting the gas stream with water, subsequently treating the gas stream in a cyclone device in which it is diluted with a diluent gas stream in a method of scrubbing a halogen-containing gas stream in **independent claim 11**, the disclosure of Sachweh et al, Smith et al is incorporated herein by reference, the most subject matters as currently claimed, have been recited in applicants' claims 7 and 10, and have been discussed therein.

As to step of withdrawing separately from the cyclone device solid particulate material and a treated gas stream in **independent claim 11**, Smith et al (EP 1023932A1) disclose the gas outlet 35 in the form of a tube set in to an upper wall 36 of the cyclone body 31 and a particle outlet 37 at the base of the conical portion 33 allowing particles to exit the body 31 under gravitational force and be collected at bottom of the body ([0039]).

As to diluent gas to be air in **claims 13** and **23**, Smith et al (EP 1023932A1) disclose the diluent gas conveniently being air ([0040]).

As to halogen-containing gas stream being an exhaust gas from semiconductor manufacture in **claim 14**, Sachweh et al (US06284022B1) disclose gas stream being suitable in principle **all gas streams** which have a carrier gas which is to be cleaned at the process temperature and which contains both gaseous and particulate contaminants which are to be removed (Col. 2, line 58-61). It would include the exhaust gas from semi-conductor manufacture as claimed.

As to each water contacting step to be arranged to be generally counter-flow relationship with the water in **claim 15,** Sachweh et al (US06284022B1) disclose in countercurrent or cocurrent (Col. 5, line 42-45).

As to gas stream flowing in a generally upward direction and water being caused to flow in a generally downward direction in **claim 16**, the figure 2 of Sachweh et al (US06284022B1) shows the features as claimed.

As to halogen-containing gas stream being a fluorine-containing gas stream in **claim 17**, Sachweh et al (US06284022B1) disclose HF, HCl or HBr (Col. 4, line 5).

As to the dilution unit in which treated gas to be diluted with a diluent gas in **claim 20**, the disclosure of Sachweh et al, Smith et al is incorporated herein by reference, the most subject matters as currently claimed, has been recited in applicants' claims 8 and 10 and has been discussed therein.

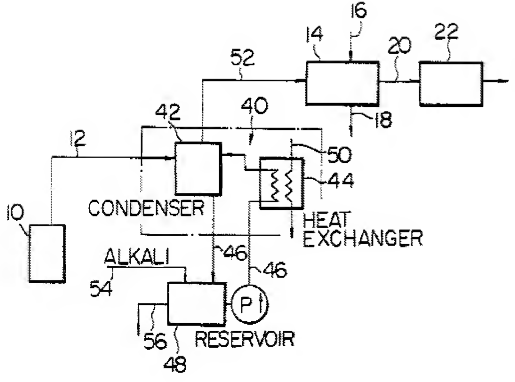
**** ALTERNATIVELY, CLAIMS 1, 3, 5 ARE REJECTED IN THE FOLLOWING *******

(4). **Claims 1, 3, 5** are rejected under 35 U.S.C. 103(a) as being unpatentable by Fujikawa et al (US 4106918).

As to step of contacting the gas stream with water at a temperature of at least 40 °C for facilitating chemical reaction between the gas stream and the water at a temperature of at least 40 °C in a method of scrubbing a halogen-containing gas stream in **independent claim 1**, water is in liquid phase in **claim 3**, gas stream to be contacted with water at a temperature of from 35 °C to 80 °C in **claim 5**, Fujikawa et al (US 4106918) disclose method of recovering fluorine from vapor of crude phosphoric acid solution (Title). To remove fluorides from a vapor generated by evaporation under reduced pressure of an aqueous solution of crude phosphoric acid containing fluorides, the vapor is at first brought into direct contact with cooling water to accomplish a

partial condensation of vapor and transfer the fluorides almost entirely to the condensate (Abstract, line 1-6). As demonstrated in Example 1, the vapor was made to contact with a 37 °C cooling water which was supplied to the partial condenser 42 (Col. 4, line 67 – Col. 5, line 1). It is further shown in the Figure below. It would be obvious to have the temperature at least 40 °C in view of the small 3 degree difference. It also would be obvious to facilitate the reactions as claimed in view of the substantially identical components and operating conditions.

Fig. 3



As to a further step treatment step comprising contacting the gas stream with water at a temperature of less than 30 °C for dissolving the gas stream in the water of less than 30 °C in **independent claim 1**, Fujikawa et al (US 4106918) disclose the non-condensed portion of vapor to be brought into contact with a separate cooling water (Abstract, line 7-8). As demonstrated in Example 1, a 27 °C cooling water to be supplied to the condenser 14 (Col. 5, line 15-17). It

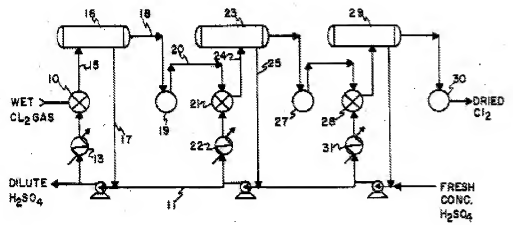
would dissolve the gas stream in view of the substantially identical components as well as the operating ocnditions disclosed by prior art, and by Applicants.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(5). **Claims 1, 3, 5** are rejected under 35 U.S.C. 102(b) as being anticipated by Carron et al (US 4381190).

As to step of contacting the gas stream with water at a temperature of at least 40 °C for facilitating chemical reaction between the gas stream and the water at a temperature of at least 40 °C; a further treatment step comprising contacting the gas stream with water at a temperature of less than 30 °C for dissolving the gas stream in the water of less than 30 °C in a method of scrubbing a halogen-containing gas stream in **independent claim 1**, water is in liquid phase in **claim 3**, gas stream to be contacted with water at a temperature of from 35°C to 80°C in **claim 5**, Carron et al (US 4381190) disclose process for drying and compressing chlorine gas (Title). It relates to the drying and compressing of gaseous chlorine using sulfuric acid (Col. 1, line 8-11). The drying and compressing are conducted in a liquid ring compressor (Col. 1, line 63-64). The sulfuric acid functions to dry the wet chlorine and functions as heat sink to cool the partially compressed gas which has been heated by the compression action (heat of compression) (Col. 2, line 65-68). The wet gas, at a temperature of from about 60-80 °C is maintained at a temperature of from 0°C to about 130°C during the drying and compression (Col. 3, line 12-15). As shown in the figure below, the diluted sulfuric acid would contain water in 1st, and 2nd stages.



Response to Arguments

(6). Applicant's arguments filed on 10/6/2009 have been fully considered but they are not persuasive.

Concerning the arguments for the prior art Sachweh et al (US 6284022) that the object of Sachweh et al (US 6284022B1) is to consolidate multiple steps of scrubbing process into a single-step method, and therefore any attempt to modify Sachweh into a two-step method would defeat its purpose. It is clear that Sachweh teaches away from a two-step method. Thus, any attempt to modify Sachweh into a two-step method would not have been obvious (¶ 4, page 9, Remarks). Although Sachweh (US 6284022B1) disclose single-step method, the background teaching of two-step scrubbing is disclosed by Sachweh (US 6284022B1), therefore, the negative teaching of Sachweh (US 6284022B1) still reads on the limitations as claimed. (Col. 1, line 63-65).

Concerning the arguments that prior art Fujikawa et al (US 4106918) fail to teach or suggest "the water at a temperature of at least 40 °C". However, Fujikawa et al (US 4106918) teach 37 °C, which is close to 40 °C, therefore, it reads on the claim by obviousness. Although Fujikawa et al (US 4106918) disclose a method of scrubbing halide (e.g. fluoride), instead of halogens (e.g., fluorine). The broad disclosure of halogen-containing would include the halide because halide contains one halogen atom at least.

Concerning the arguments that Carron et al (US 4381190) use concentrated sulfuric acid. In Carron, water scrubbing simply would not work because it cannot extract water from wet

chlorine gas. However, the stage and 2 which use dilute sulfuric acid to dry the chlorine gas, the dilute sufuric acid contains significant amount of water, therefore, it still reads on the limitations as claimed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu
Art Unit: 1797
Date: February 1, 2010

/Duane Smith/

Supervisory Patent Examiner, Art Unit 1797